UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
PLANT SCIENCES DIVISION
Washington, D. C.

AND

ARIZONA AGRICULTURAL EXPERIMENT STATION
TUCSON, ARIZONA

AND

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT SCIENCE RESEARCH DIVISION
Beltsville, Maryland

NOTICE OF RELEASE OF 'PALAR' WILMAN LOVEGRASS

The Plant Sciences Division, Soil Conservation Service, United Stator Department of Agriculture, the Arizona Agricultural Experiment Station, and the Plant Science Reeearch Division, Agricultural Researeh Service, United States Department of Agriculture, announce the release of Palar Wilman lovegrass (Eragrostis superba Peyr.). It: war developed by Robert D. Slayback and Clinton W. Renney, SCS Plant Materials Center, Tucson, Arizona. The Arizona Agricultural Experiment Station participated in the evaluation. The Agricultural Research Service cooperated in the assembly and evaluation.

Palar is an open-pollinated line (experimental designations P-15628 and A-16613) received in 1962 as PI 276055 from the W-6 Plant Introductfon Station, Pullman, Washington. Development has been by selection from among flfteen accessions of source material in 1963. Direct increase 'of tha original source material constitutes the variety.

Palar is a perennial, warm-season bunchgrass with excellent seedling vigor. It is *very* drought tolerant and is one of the most palatable of introduced grasses grown in Arizona. It demonrtrated superior performance in seedling establishment, vigor and yield compared .to other accessions of Wilman lovegrass, 'Catalina' weeping lovegrass, and A-68 Lehmann lovegrass at three range sites. It is well adapted to the desert grasslands of the southwest with 12 to 16 inches total precipitation at elevations below 4500 feat. It grows beat on randy loam to clay loam soils and has survived winter tanperaturer of 10 F,

Palar was terted and developed primarily for revegetation of rangeland, but has shown good performance in the erosion control and beautification of mine rpoil banks and roadside plantings.

Breeder'e and foundation seed of Palar is maintained by the SCS Plant Materials Center, Tucson, Arizona, 85705, and is increased under the limited generation program recognizing foundation and certified seed classes. Limited certified seed is expected to be available in November, 1972.

Suggested release date of Palar Wilman lovegrass is March 1, 1972.

D.M. Whitt
Director
'Plant Sciences Division, SCS
U. S. Department of Agriculture

3/28/72
Date

Richard B. Ogle
Director
Arizona Agricultural Experiment Station

3/3/72
Date

W.E. McCaslin
Acting Director
Plant Science Research Division, ARS
U. S. Department of Agriculture

3/11/72
Date

NATIONAL CERTIFIED GRASS VARIETY REVIEW BOARD

(The criteria for evaluation of applications were developed by the National Grass Variety Review Board and the AOSCA.)

Applicant's name: Plant Sciences Division
USDA Soil Conservation Service Date: 12/22/71

Address: Soil Conservation Service
Plant Materials Center
3241 N. Romero Road
Tucson, Arizona 85705

Sponsoring institutions:

a. Plant Sciences Division
Soil Conservation Service
U.S. Department of Agriculture

b. Arizona Agricultural Experiment Station
University of Arizona

c. Plant Science Research Division
Agricultural Research Service
U.S. Department of Agrlculturc

Breeder's name: Tucson Plant Materials Center
Soil Conservation Service

Variety name: 'Palar' Species common name: Wilman lwegrass

Experimental designation: A-16613 and P-15628

Species latin name: Eragrostis ruperbo Peyr.

Primary use: Range

Date certified seed will be offered for sale: November 1972

Proposed release date: February 15,1972.

Submit 9 copies of application and supporting material to:

Jerrel B. Powell, Chairmen, National Certified Grass Variety Review Board, Plant Science Research Division, ARS, USDA, Plant Industry Station, Beltsville, Maryland 20705

I. Summarize advantages over similar varieties and/or other distinguishing characteristics which demonstrate merit for certification;

'Palar' Wilman loregrass has demonstrated superior performance in seedling establishment, vigor and yield compared to other accessions of Wilman lovegrass, tables 1 and 2. There tables also show superior performance of 'Palar' compared to Lehmann lovegrass and Boer lovegrass in the desert grassland zone with summer rainfall of 6.5 to 9 inches. In the drier desert shrub zone with summer rainfall between 4 and 6 inches 'Palar' is performing nearly as well as other lovegrasses, tables 3, 4, 5 and 6.

Wilman lovegrass is recognized by ranchers and others for its superior grazing preference compared to other lovegrasses. Digestibility studies, utilizing the in ritro rumenal fermentation technique, are being conducted by Arizona Agricultural Experiment rtation. Preliminary results show 'Palar' has less non-digestible fiberous material and a greater percentage of digestible dry matter than A-68 Lehmann lovegrass or 'Catalina' loregrass.

'Palar' Wilman loregrass has given high seed yields, table 8. Germination of 'Palar' seed is very good with a good percentage of firm seed, table 9. Firm seed, a form of dormancy, is a favorable factor aiding establishment on droughty rites.

The former commercial source of Wilman lovegrass, no longer available, did not come from an officially released variety. Demand for Vilman seed is Increasing and the superior performance of 'Palar' compared to other Wilman lovegrass accessions recommends its release to meet the demand.

II. Germplasm source, breeding procedure, population rise, and time sequence including dater used in developing variety:

Source material was received as Plant Introduction PI 276055 from W-6 Plant Introduction Station, Pullman, Washington in 1962. Development has been by selection from among fifteen accessions of source material in 1963. Direct increase of the original mource material constitutes the variety.

III. Area of probable adaptation, including moisture requirement (rainfall or irrigation):

'Palar' is well adapted to the desert grasslands of the southwest with 12 to 16 inches total precipitation at elevations below 4500 feet. It is moderately well adapted to the drier desert shrub areas where precipitation ranges from 10 to 12 inches. For best performance 'Palar' ham a higher moisture requirement than Lehmann or Boer lovegrass. 'Palar' grows bert on sandy loam to clay loam soil. It has survived winter temperatures of 10 F.

IV. Evidence of performance, including comparative data and statements on yield (in pounds per acre), insect or disease resistance (state causal organism if known), and other factors.

1. Comparative yields at specified locations.

Forage production figures are given in tables 1, 2, 4, 5 and 6. They show superior performance of 'Palar' compared to other strains of Wilman lovegrass, and also other lovegrasses when grown in the better precipitation areas, tables 1 and 2. Very good seed yields are recorded at the Tucson Plant Materials Center, table 8.

2. Persistence (cold and drought tolerance survival, etc.)

Wilman lovegrass has been persisting in good stand8 under range use on Rancho Sacatal, Cochise County, planted in 1955. It is also maintaining good stands on John Murphy's OU Ranch, Pinal County, planted 1952.

Several plantings, including the Rancho Sacatal planting and the Joe Giacoletti planting east of Bisbee, are surviving at elevations of 4,400 to 4,600 feet where winter temperatures have dropped as lor as 10 P. for brief periods. 'Palar' Wilman lovegrass in trial plantfngs at Rancho Sacatal has shown less winter injury than the standard commercial Wilman lovegrass.

'Palar' is very drought tolerant. It Fa maintaining fair to good stands with as little a8 9.00 Inches total yearly precipitation and only 3.00 to 4.50 inches summer rainfall at the Pima planting site as shown in tables 3 and 4.

3. Pest resistance

No serious disease or insect problems have been noted.

4. Other such as chemical composition, leafiness, digestibility, palatability, etc.

'Palor' Wilman lovegrass is one of the most palatable of Introduced grasses grown in Arizona. In all field trial plantings that are not protected it is the first lovegrass to be grazed to the ground. It has numerous relatively broad leaves, compared to other lovegrass. Leaves are basal end carried high on the culms. Preliminary digestibility trials show 'Palar' to have a greater percentage of digestible dry matter than A-68 Lehmann lwegrass or 'Catalina' lovegrass.

V. Breeder seed, seed classes, sequence of generations:

Breeders seed is produced from a breeders block established from the selected source materiel. The breeders block is maintained by the Tucson Plant Material Center, 3241 W. Romero Road, Tucson, Arizona, 85705, The variety is limited to one generation each of breeder, foundation, end certified seed. Foundation seed is produced and maintained by the Tucson Plant Material Center.

VI. Agronomic and botanical charactetistfcs for Identification:

A. Wilman lovegrass E. superba has been reported as having sexual reproduction and cross-pollination, Streetman L.J., Wrightia Vol. 3, No. 3, March 1963.

B. 'Palar' Wilman lovegrass is a perennial, warm-season bunchgrass with strong seedling vigor.

C. The inflorescence is a narrow panicle 15 to 30 cm. long; spikelets light straw colored, very flat, 17 to 27 flowered, 1 to 1.5 cm. long, 6 to 9 mm. wide; awnless.

D. Culms 50 to 100 cm. tall; leaves basal end carried well up on flowering stems are 4 to 8 mm. wide and 20 to 40 cm. long.

E. Seeds are light reddish brown, oval shaped, and very small, 1,000,000 to 1,200,000 per pound.

F. Under irrigation spring growth starts March 15 to 30. At Tucson two seed crops are taken. The first crop is harvested June 15 to 30. Fields are clipped and the second crop is started August 1 to 10 so that flowering occurs during the cooler fall temperatures. Second crop harvest occurs October 25 to November 5.

Robert A. Slayback
Signature of Applicant

Robert D. Slayback
Manager, Tucson Plant Materials Center

SUMMARY OF SCS-PMC FIELD EVALUATION PLANTINGS DATA

Table 1 - Performance of Wilman and Boer lovegrass strains at the Rancho Sacatal Field Evaluation Planting - Elevation 4500'
Major Land Resource Area 41 - Sonoita-like sandy loam soils.

Species	Accession	Plants per ft^2				Yield lbs/Ac	
		10/67	11/68	11/69	10/70	11/69	10/70
1967 Planting							
Eragrostis superba	A-11965	9.0	2.3	0.86	0.86	403	635
Eragrostis superba	'Palar'	9.0	2.3	1.00	1.09	1046	1235
E. curvula var.conferta	A-84	1.7	1.2	0.55	0.44	720	622
" " " "	Catalina	0.9	2.5	1.53	1.17	709	628
1968 Planting							
Eragrostis superba	A-11965	-	1.2	0.15	0.15		
Eragrostis superba	'Palar'	-	1.9	1.00	0.52		
E.curvula var conferta	A-84	-	Trace	Trace	Trace		
" " " "	Catalina	-	Trace	Trace	Trace		
1969 Planting							
Eragrostis superba	A-11965	-	-	4.90	1.42		
Eragrostis superba	'Palar'	-	-	5.87	2.00		
E.curvula var conferta	A-84	-	-	3.17	0.23		
" " " "	Catalina	-	-	3.23	0.33		
1970 Planting							
Eragrostis ruperba	A-11965	-	-	-	0.58		
Eragrostis superba	'Palar'	-	-	-	1.56		
E.curvula var conferta	A-04	-	-	-	0.63		
" " " "	Catalina	-	-	-	0.77		

Rancho Sacatal FEP
Rainfall Summary - 1967-70

Month	1967	1968	1969	1970
July	3.00	3.85	3.45	2.10
August	1.80	2.30	2.30	2.10
September	0.60	0.06	0.45	0.50
Totals	3.40	6.21	6.20	4.70

Table 2 - Performance of Lehmann, Wilman and Boer lovegrasses planted in 1968, 1969, 1970 and 1971 at the Snnta Rita Field Evaluation Planting - Elevation 3000'
Major Land Resource Areo 40, Anthony loam soils.

Species	Accession	Plants per ft^2*				Yield lbs/Ac**
		1968	1969	1970	1971	1970
Eragrostis lehmanniana	A-68	0.72	1.08	1.12	2.48	92a
Eragrostis curvula var. confcrto	Catalina	Trace	0.36	0.13	2.13	348
Eragrostis superba	A-11965	0.63	3.04	0.65	3.25	1251
Eragrostis superba	A-12639	0.21	2.50	0.19	2.67	-
Eragrostis superba	'Palar'	0.63	3.00	0.94	4.79	1524

*An average of 15 samples per plot taken 11-23-71.
**Air dry yields on 1969 planting.

SANTA RITA FEP RAINFALL SUMMARY

Month	1968	1969	1970	1371
July	3.05	3.37	2.41	1.98
August	4.27	4.12	1.41	4.60
September	0.45	1.67	3.30	1.14
Totals	7.77	3.16	7.12	7.72

Table 3 - University of Arizona Watershed Management Department planting made March 1966 at the Pima, Arizona site. Plant counts recorded in November for four successive years as number per 100 square feet. Major Land Resource Area 42, elevation 3100 feet.

Species	Accession	1966	1967	1968	1969
Eragrostis lchmanniana	A-68	108	36	60	54
Eragrostis curvula var. confcrtn	'Catalina'	194	46	50	54
Eragrostis superba	'Palar'	96	28	36	10

Table 4 - University of Arizona Watershed Management Department planting made March 1969 at the Pima, Arizona site. Plant counts taken in November 1969 and 1970 and yield taken as dry matter 1970. Major Land Resource Area 42, elevation 3100 feet.

Species	Accession	Plants/100ft^2 1969	Plants/100ft^2 1970	Yield lbs/Ac 1970
Eragrostis lehmanniana	A-68	53	19	325
Eragrostis curvula var. confcrtn	'Catalina'	76	8	a4
Eragrostis superba	'Palar'	53	5	123

Table 3 - University of Arizona Watershed Management Department planting at Bowie, Arizona site March 1969. Planted on pitted seedbeds on creosotebush and on mesquite sites. Plant counts per 109 square feet taken two years. Yield as pounds dry matter per acre taken one year onmesquite site only. Major Land Resource Area 42, elevation 3500 feet.

Species	Accession	Creosotebush Plants 1969	Creosotebush Plants 1970	Mcsquite Plants 1969	Mcsquite Plants 1970	Mcsquite Yield 1970
Eragrostis lehmanniana	A-68	233	85	286	167	680
Eragrostis curvula var. confertn	'Catalina'	83	49	137	41	199
Eragrostis superba	'Palar'	65	34	66	24	533

Table 6 - University of Arizona Watershed Management Department planting at San Simon, Arizona site March 1969. Planted on pitted seedbeds. Plant counts in November as number per 100 square feet, yield in pounds dry matter per acrc. Major Land Resource Area 42, elevation 4000 feet.

Species	Accession	Plants 1969	Plants 1970	Yield 1970
Eragrostis lehmanniana	A-68	210	188	419
Eragrostis curvula var. conferta	'Catalina'	163	40	231
Eragrostis superba	'Palar'	75	65	439

Table 7 - University of Arizona Watershed Management Department planting sites. Accumulated rainfall for July, August and September.

	Inches 1966	1967	1968	1969	1970
Pima	3.28	3.40	4.60	2.09	4.14
Bowie creosote	-	-	4.07	4.52	3.06
Bowie mesquite	6.05*	5.05	5.37	4.42	3.70
San Simon	6.22*	8.90		5.55	5.35

* Cwers period July thru November

Table 8

SEED PRODUCTION OF ERAGROSTIS SUPERBA 'PALAR'

Tucson Plant Materials Center

Planted	Seed Production (lbs/acre) 1968	1969	1970	1971
8-67	542	440	520	345
7-70	-	-	300	625

Table 9

GERMINATION TESTING* of ERAGROSTIS SUPERBA 'PALAR'

Year seed grown	Test dates 10-68	10-69	8-70	12-70	9-71
1967	Germ - 73% Firm - 24%.				
1968		Germ - 53% Firm - 34%	Germ - 59% Firm - 26%.		
1969				Germ - 52% Firm - 35%.	Germ - 66% Firm - 28%.
1971					Germ - 24%. Firm - 67%

*Official laboratory

Performance of Wilman lovegrass 'PALAR' in field plantings 12-2-71

Planting Site	Soil	Remarks
Kendrick Holder 7-9-69 Globe, Ariz. MLRA 39 Elev. 3500' Prec. 12-14" 200 A planted	1. Thin clay loam 1" over dark reddish brown gravelly clay B to 25" then Bca strongly effervescent (pH 7.4) to 40" on 2 to 5% slope. 2. Rough broken land of the same material given above.	Boer, 'Palar', Blue panic planted at ½-½-3 lbs/A or 13.6-4.4-13.6 PLS ratio. Very poor initial establishment due to very poor rain. Estimated stand - Boer 0%, 'Palar' 30%, blue panic 70%. Fall 1970 stand greatly improved, 1 plant per 5 sq ft. 10%Boer, 40% 'Palar', 40% blue panic. Vigor good. Heavily grated fall 1970. Good recovery summer 1971. 'Palar' and blue panic superior to Boer in stand and vigor.
Douglas Airport 7-15-69 Douglas, Ariz. MLRA 41 Elev. 4300' Prec. 12-14" 100 A planted	1. Shallow brown loam, 13" over lime cemented hardpan (pH 8.2) strongly effervescent. 2. Deep broun loam A 12", B 1 to 21" brown heavy loam, over B2t yellowish red clay loam to 29", B3ca brown clay loam to 54". All strongly effervescent (pH 8.2).	Mix 'Palar' and yellow bluestem at ½ & 1 lb/A or 4.4 - 9.0 PLS ratio. Very good establishment and vigor (1 plant/sq ft) 70% 'Palar' and 30% yellow bluesten. Very cold winter 1970-71 and dry spring 1971 reduced stand and vigor of both species especially on shallow soil. Stand and vigor about equal, 1 plant per 4 sq ft. Heavy brush re-invasion.
Paul Ramsower 5-19-70 Douglas, Ariz. MLRA 41 Elev. 3800' Prec. 11-12" 100 A planted	1. Shallow to mod. deep pinkish gray loam to weakly cemented calcareous volcanic ash beds. Strongly effervescent (pH 8.0). 2. Deep brown loam A 5" over B1t brown clay loam to 8" over B2tca reddish brown clay loam over Cca clay loam to 60". All strongly effervescent (pH 8.2).	'Palar' and blue panic planted 0.7 and 6.0 lbs/A or 6.2 - 27.3 PLS ratio. Fair to good establishment late in summer, 70% blue panic, 30% 'Palar'. Heavy mortality both during very cold winter 1970-71 and very dry spring 1971. Excellent regrowth and reestablishment of stand especially 'Palar' during summer vith good moisture. Rating on 9-24-71 showed 'Palar' good stand, recovery and vigor. Blue panic fair stand, good recovery and vigor,

2-Performance of Wilman lovegrass 'Palar' in field plantings

Planting Site	Soil	Remarks
Midvale Ranch 7-9-70 Winkelman, Arizona HLRA 41 Elev. 4000' Prec. 12-14" Small plots	Soil similar to Continental gravelly loam.	Not a field planting but smell plots of 19 species broadcast and raked in on land cleared with rock rake on D-8 tractor. Excellent stand 'Palar', Boer, blue panic, creeping dropseed, yellow bluestem, sand dropseed and Atherstone lovegrass. Stand of 'Palar' thinned by very cold winter end dry spring but still good stand (1 plant/sq.ft.), good vigor.
Valter Remmers, Spring 1910 Pomerene, Ariz. MLRA 41 Elev. 3400' Prec. 11-12" 40 A planted	Coarse gravelly sandy loam outwash from adjacent hills.	Boer, 'Palar', bluepantc, Atherstone, Kleingrass, plains bristlegrass and cottontop planted by Professor Frost in pits. Excellent stand and vigor 'Palar' and Atherstone, good stand and vigor bluepanic end Boer, fair stand plains bristlegrass and Kleingrass, poor stand cottontop. 'Palar' grazed first and heaviest followed hy bluepanic.
WIH Ranch 7-20-71 Continental, Ariz. Elev. 3000' Prec. 10-12" 300 A planted	Anthony sandy loam Tubac sandy loam Tubac randy clay loam	'Palar' planted in seperate field compared to mixture of bluepanic, Boer and Lehmann. Planting on irrigated cropland without irrigation. Poor seedbed disked to control weeds, should have been pitted because sealed quickly with first rain. Early rains light. Good rains came late. Poor scattered rtand of 'Palar', good vigor, headed from the early rain; 'Palar' stand improved with late rains. No plants of other species found.